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ABSTRACT

Spontaneous and model-induced production of a
valuational style of inquiry was studied in 128 third grade children.
Provision of a favorable versus a neutral outcome-expectation, and
sex of child failed to influence the results. All modeling groups
displayed strong value-question increases over baseline which,
without further tutelage, they generalized to a new set of stimulus
pictures. Four instructional variations, implicit, explicit, pattern
(calling notice to an underlying similarity among the model's
questions), and mapping (exemplifying essential features of the
model's paradigm) proved to differ significantly in the postmodeling
imitation phase but not in generalization. The conceptual and
pedagogical relevance of the results were discussed. (Author)

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INSTRUCTIONAL SPECIFICITY AND OUTCOME-
EXPECTATION IN OBSERVATIONALLY-INDUCED
QUESTION FORMULATION

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INSTRUCTIONAL SPECIFICITY AND OUTCOME-EXPECTATION IN
OBSERVATIONALLY-INDUCED QUESTION FORMULATION¹

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In a previous experiment, Rosenthal, Zimmerman, and Durning (in press) have shown that observation of a model's styles of inquiry pertaining to a set of stimulus pictures was effective in creating marked changes in the question-formulation of sixth-grade, primarily Mexican-American children from economically-disadvantaged homes. Separate groups of youngsters observed the model create questions based on nominal or physical properties of stimulus objects, on functional uses to which stimuli might be put, on abstract relations concerning the stimuli, or on judgments of value and preference regarding the stimuli. All groups not only adopted the model's interrogative-class paradigms, but without further tutelage, generalized them to a new set of stimulus pictures. A further comparison between implicit instructions to emulate the model's rubric, and explicit instructions to try to learn and utilize her question-paradigm only created differential imitative responding for the nominal-physical modeling group. It thus seemed of interest to investigate a range of instructional variations from minimal, implicit directions to follow the model's example, through a condition calling specific attention to the abstract properties exemplified in the model's responses. For this purpose, it appeared germane to study the judgments of value and preference question-category which

had formerly yielded the lowest baseline incidence (virtually zero), and which was governed by criteria identical with Piaget's (1959, p. 217) definition of valuation. The present experiment attempted to extend the prior findings to a considerably younger group of third-grade, middle-class children.

The current social psychological literature has given a prominent role to situational "demand characteristics" (Orne, 1962 and 1969), and to "experimenter effects" (Rosenthal, 1966; Rosenthal & Jacobson, 1968). In essence, this body of research has repeatedly found that the situational cues conveyed by experimental procedures, and a research subject's inferences about what the situation "requires", or what the experimenter anticipates or wishes to demonstrate, can markedly influence subjects' behavior and, hence, the results obtained. If the provision of an expectancy that one will do well, or that the experimenter wants and expects one to do well, were itself an operation adequate to facilitate the acquisition or transfer of abstract paradigms, such a device would be valuable in fostering learning. Accordingly, half the children within each instructional variation were given either a favorable or a neutral expectation of their outcome performance by the experimenter.

Method

Subjects

From five third-grade classrooms at two schools serving predominantly middle class, Anglo-American regions of Tucson, 64 boys and 64 girls were randomly drawn. To each of the eight (4 instructional X 2 expectation) experimental conditions, 8 boys and 8 girls were randomly

assigned with the constraint that the proportions from either school be comparable; all data were collected in the midpart of spring semester when the children were typically about 9 years old.

Materials and Model's Questions

The stimuli were identical with those previously described (Rosenthal, Zimmerman, & Durning, in press). Two parallel but different sets of 12 pictures were used; in each set, items showing one achromatic common object (e.g. a typewriter) were successively alternated with items showing three variously-colored common objects (e.g. a yellow balloon, a yellow banana, and a red apple per card). Thus, to prevent response stereotypy, within each set of stimuli consecutive items varied in number, color, and pictorial content. The first set of pictures was displayed to all children during baseline, was the vehicle for the model's questions, and was then readministered to all subjects to assess imitative changes. The second set of pictures was subsequently presented without further intervention to all children, to assess generalization of question-formulation.

For all subjects, the model's questions, in the same order, were as follows: "1. Which of these do you like best? 2. Do you like this kind of typewriter? 3. Which do you think is the prettiest? 4. Would you rather sit on a park bench or on the ground? 5. Do you like the brush or the comb better? 6. What do you like about this? 7. Would you rather eat with a fork or a spoon? 8. Do you like to cut things with scissors? 9. Which would you rather hear, the drum or the bugle? 10. Do you like the shape of this cup? 11. Which of these would you rather have for your own? 12. Do you like screws or nails better?" At no time were praise

or KR administered to the model's or the subjects' questions, and no extrinsic incentives were offered or applied.

Correct response was defined as any question relating to valuation-al matters about the stimuli, and was thus based only on the categorical properties of the model's questions, not their specific content. A child's score was the sum of the trials on which he produced value-related questions. The prior study disclosed that such scoring is highly reliable and easily accomplished; in the present data, fewer than 2% of response instances required discussion by the authors to make scoring decisions. All data were collected by the same adult, male experimenter and adult, male model.

Procedure and Design

The child was taken individually to a testing room by the experimenter who there introduced him to the model. In baseline, the experimenter instructed the child as follows: "I'm going to show you a set of cards. Ask something about each card." Then, "Here is the next card, ask something about it," etc.

•• Expectation variations. After baseline, the experimenter instructed the favorable expectation subjects as follows: "I have been working with this game for a long time and with a lot of students. From the way you did, I can tell that you really have talent for this game. Once you get the hang of it, I'm sure that you are really going to do a great job! With your talent, all you need are a few hints." The foregoing comments were omitted in the neutral expectation condition, and the experimenter then presented the instructional variations as follows:

Implicit instructions. "Now this man is going to make up a question

about each picture. You watch carefully, and you will have another turn later." (The model performed.) Next: "Now you can have another turn to make up questions about each picture."

Explicit instructions. "Now this man is going to make up a question about each picture. You watch carefully and try to learn his questions just as well as you can, and you will have another turn later. (The model performed.) Next: "Now you can have another turn, etc.", plus: "Try as hard as you can to make your questions like the man's questions."

Pattern instructions. "Now this man is going to make up a question about each picture. You watch carefully and try to learn his questions just as well as you can. All of his questions are the same in a certain way. Try to learn how his questions are the same, and you will have another turn later." (The model performed and, afterward, the child was given the same final directions as in the explicit treatment.)

Mapping instructions. "Now this man is going to make up a question about each picture. You watch carefully and try to learn his questions just as well as you can. All of his questions are the same in a certain way. That is, all of his questions ask about 'Which do you like?', 'What is prettiest?', 'Which would you rather have?' Try and learn his way of making questions and you will have another turn later." (The model performed and, afterward, the child was directed as in the explicit treatment.)

Subsequent to readministration of the initial stimuli, the new set of generalization pictures was introduced, without modeling, and all children received the same instructions as follows: "Here are some new

cards; ask a question about each one." The model recorded the child's question responses and hence was present throughout the entire procedure.

Upon the completion of the experiment, self-report information concerning the child's perceived level of success on the task was solicited. The child was asked to respond in an affirmative or negative fashion to the following question: "Did you do a good job on the game?" The answers were dichotomously scored for subsequent data analysis.

Preliminary analyses were first performed on the change scores from baseline to imitation, and from baseline to generalization phases, for sex X instructions X expectation. These analyses (which gave results concordant with those reported below) revealed neither significant sex effects or interactions with any other variate, nor suggestive trends. The largest trend observed was the interaction between instructions and sex for the baseline to generalization phase changes ($F = 1.91$, $p < .13$). All other comparisons were nonsignificant (all F 's ≤ 1.33 ; NS). Accordingly, the sexes were combined for the main analysis which factorially compared the 4 instructional X 2 expectation treatments across baseline, imitation, and generalization phases as trials. Given a significant³ overall effect, Tukey's HSD tests, (Kirk, 1968) were used to evaluate differences between baseline and the other phases, and between pairs of treatment groups.

Results

The major analysis of variance revealed that the favorable versus neutral expectation treatments utterly failed to differ, nor did expectation interact with instructions or across-phases change (all F 's < 1.0 ; NS); thus, the expectancy variations were combined for all Tukey analyses, and in Table 1 which presents the means by phase for the four

instructional conditions.

insert Table 1 about here

Observation of the model's demonstration produced strong increases from baseline across trials ($F = 293.89$; $df = 2/240$; $p < .0001$). Differential pre-modeling instructions created significant between-groups differences ($F = 3.48$; $df = 3/120$; $p < .02$), and instructions interacted with trials ($F = 4.18$; $df = 6/240$; $p < .001$). Tukey tests revealed that the four instructional variations did not differ significantly in baseline; after observing the model, the subjects, aggregately, surpassed their baseline scores in the imitation and in the generalization phases (both p 's $< .01$). Moreover, when the instructional variations were separately compared across trials, each modeling group displayed significant increases over its baseline responses in both the imitation and the generalization phases (all p 's $< .01$).

Further analysis of the interaction term disclosed that, although not at generalization, the mapping group significantly surpassed the implicit group ($p < .05$) in the imitation phase. No other selected comparisons between pairs of specific instructional groups attained significance, although considerable numerical difference among means for the imitation phase is revealed in Table 1.

The foregoing analyses point up vividly the power of modeling procedures, when joined with effective orienting instructions, in transmitting complex conceptual paradigms rapidly. Under the present task and procedural conditions, calling the child's attention to an underlying

similar pattern in the model's questions failed to add any useable information to the explicit instructions, unlike the mapping technique which exemplified the regularities of the question category.

It is of interest to compare the results for implicit and explicit conditions in the present sample (middle-class, Anglo-American third-graders) with the corresponding treatments in the prior sample (economically-disadvantaged, Mexican-American sixth-graders). Although not significantly different by Tukey tests, the younger children presently studied numerically surpassed both imitation and generalization phase means of their older counterparts (see Table 1). Obviously, it is not possible to isolate the separate contributions of age, ethnicity, and socioeconomic status but this comparison emphasizes that linguistic and economic marginality were sufficient to impair the performance of the older children to a degree that was not fully equalized by their three year advantage in age over the present middle-class youngsters.

After completing all other experimental procedures, at the conclusion of the generalization phase assessment, each child was asked "Did you do a good job?" and dichotomous ("yes" or "no") responses were recorded. The proportions of "yes" responses for the four instructional variations are presented in Table 2 which also provides the point-biserial correlations between each group's imitation and generalization scores and the children's self-reports of task success.

insert Table 2 about here

Inspection of Table 2 suggests that the instructional variations

gave differential self-reports of having done "a good job." The proportions of "yes" responses differed significantly among groups by a chi-square analysis ($\chi^2 = 8.32$; $df = 3$; $p < .05$). Yet, there seemed very little relationship between the children's verbal reports and the actual attainment of their group. Although that group (mapping) which performed best also judged their own performance most favorably, the second-highest-scoring group (explicit) judged themselves as poorest, and the two lowest-scoring groups gave intermediate self-reports. Similarly, when each child's actual scores were related to his self-report no evidence of systematic covariation was observed. Of eight coefficients, only that for the explicit group in the imitation phase attained significance, and in two cases negative relationships between actual and self-judged performance were found. Thus, despite considerable evidence for the production of actual conceptual learning, children's verbalization appeared to show little relationship to abstract performance. These data provide further evidence (vide Kendler & Kendler, 1967; Morris, 1970) that for young children verbal labels have tenuous or inconsistent relationships with actual inferential performances.

Discussion

The present results further confirm the power of vicarious training procedures for instating abstract, novel paradigms in observers who then generalized the rule-governed categorical properties to new stimulus instances without further training. These findings extend the previous results downward to third-graders across sex of child and of model (now male, previously female); descriptively, at least in the imitation phase, explicit instructions appeared to enhance response over implicit

instructions to a greater extent for the present youngsters than for the prior, older sample. Bandura (e.g. 1969 and 1971) has discussed in detail the features which make vicarious training an exceedingly powerful means of transmitting abstract, complexly-organized behavior.

Although not specifically investigated, it is of interest to compare the relative contributions of demonstration via modeling versus instructional techniques in producing the outcomes observed. Within the scope of the present operations, two obvious comparisons are possible and both assign the larger information-transmitting role to vicarious training: If one treats the mean of the highest scoring group (mapping instructions in the imitation phase) as unity, then the "pure modeling", implicit instructions group attained over 57% of the maximum observed. If instead, one examines the generalization phase data, the "pure modeling" group performed almost as well as did any of the modeling plus instructions combinations studied.

That favorable expectation did not influence the present task with middle class youngsters nor (in as yet unreported research) a different, sensori-motor concept attainment task with economically-disadvantaged children, should not lead to a premature conclusion that "teacher's" attitude does not affect children's scholastic accomplishment. A striking feature of vicarious training is its rapidity in modifying complex behavior. Motivational or expectancy variables may require a longer time-span to play a cumulative role. For example, it was found (Rosenthal et al, 1970) that an experimental program of teacher training created strong and broad attitude changes in the teachers so trained; these attitude effects were elsewhere (Rosenthal, Underwood, & Martin, 1969) shown

to be associated with important aspects of classroom behavior: Thus, by comparison with a large sample of conventional classrooms, the trained teachers displayed greater use of gestural, physical, verbal and total approval, and less use of censure. Reciprocally, solicitation of teacher attention by children was considerably greater for the trained teacher-group and (over all classrooms) total approval and total spontaneous solicitation covaried substantially ($r = .52$). Further, within the trained group, frequency of solicitation increased from first to third grade but no greater willingness to engage the teacher's participation was found in conventional classrooms as grade level ascended. Similarly, Rosenthal and Jacobson (1968) have shown that teachers' expectations of students' "late-blooming" capacity can importantly influence educational accomplishment. All the foregoing, "motivational", research employed longitudinal procedures such that expectation factors were operative from one to three years, quite unlike the brief, single-session present design.

Since the spontaneous incidence of value-judgment questions was very nearly zero in baseline, it is of interest to consider the present results of modeling upon style of inquiry in light of Wallach and Kogan's (1965) conception of "creativity". These writers define creativity in terms of the uniqueness (low probability) of associational responses, and state that "responses of greater stereotypy are likely to come earlier in the sequential emission of a series of associations; responses of greater uniqueness, if they come at all, are likely to come later (p. 17)." If one accepts their definition, then the present findings can be construed to demonstrate that observation of a model was a potent technique

for eliciting "creative" question-formulation, whose unique (i.e. low probability) properties were then, without further intervention, transferred to new stimuli by all the groups studied.

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Footnotes

1. This study was supported by the Arizona Center for Early Childhood Education as a Subcontractor under the National Program on Early Childhood Education of the Central Midwestern Regional Laboratory, a private non-profit corporation supported in part as a regional educational laboratory by funds from the U. S. Office of Education, Department of Health, Education, and Welfare. The opinions expressed in this publication do not necessarily reflect the position or policy of the Office of Education, and no official endorsement by the Office of Education should be inferred. We wish to acknowledge the generous cooperation of Principals L. H. McQuary and U. G. Upshaw, of their teachers, and of the administration of Tucson School District 1. Allyn Spence served ably as the model and Maure Hurt, Jr., assisted in diverse ways.

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3. All tests of significance reported in this paper were based on two-tailed probability estimates.

Table 1

Mean Value-Preference Questions by Phase for
Experimental Instructions Groups

Group	Phase		
	Baseline	Imitation	Generalization
Present study: third graders			
Implicit	0.32	5.91	5.09
Explicit	0.19	9.40	6.66
Pattern	0.00	8.16	5.69
Mapping	0.06	10.31	6.44
Prior study: sixth graders			
Implicit	0.21	5.43	4.36
Explicit	0.07	7.00	4.79

Table 2

Proportion of Children Reporting Success by Group, and Point-Biserial
Coefficients between Self-Reported Success and
Imitation and Generalization Phase Scores

Group	Proportions	Correlations	
		Imitation	Generalization
Implicit	0.636	.22	.15
Explicit	0.455	.51*	.22
Pattern	0.636	.03	-.21
Mapping	0.788	.08	-.17